

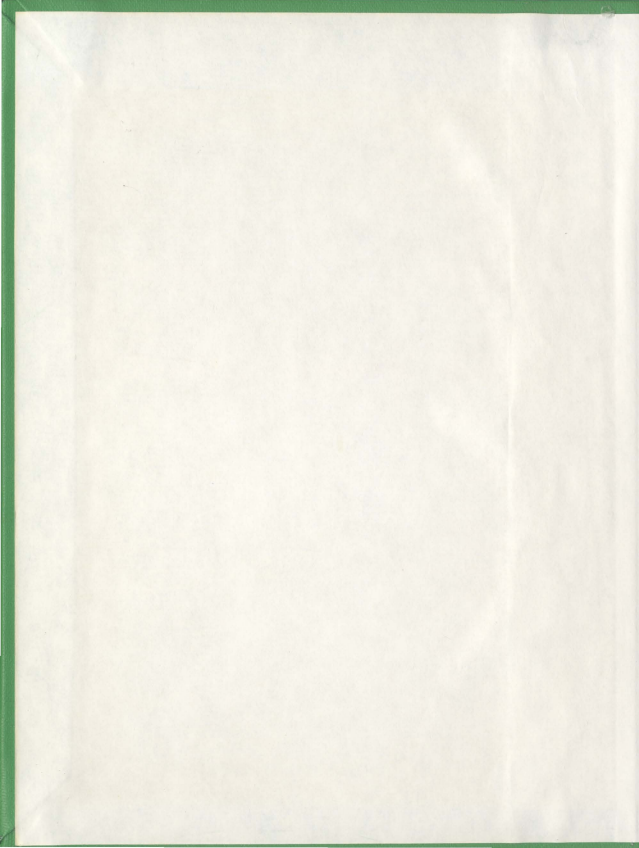
A STUDY TO COMPARE  
INVOLVEMENT IN FITNESS  
PROGRAMS, KNOWLEDGE OF  
FITNESS, ATTITUDE TOWARDS  
FITNESS, PERCEIVED FITNESS  
AND ATTAINED FITNESS LEVELS  
OF UNIVERSITY STUDENTS

CENTRE FOR NEWFOUNDLAND STUDIES

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A Study to Compare Involvement in Fitness  
Programs, Knowledge of Fitness, Attitude towards  
Fitness, Perceived Fitness and Attained Fitness  
Levels of University Students

by

© Gerald Wayne Wheeler, B.P.E., B.Ed.

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of the requirements for the degree of  
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## ABSTRACT

The purpose of this study was to compare the relationships among involvement in fitness programs, knowledge of fitness, attitude toward fitness, perceived fitness and attained fitness levels as characteristics of physical fitness of university students. A battery of tests to measure each of the variables was administered to forty-two university students enrolled in the spring semester Education 3070, a third year course.

Significant positive correlations were found between the following variables: involvement in fitness programs and attitude toward fitness, involvement in fitness programs and knowledge of fitness, involvement in fitness programs and actual fitness levels, attitude toward fitness and perceived fitness, attitude toward fitness and actual fitness levels and perceived fitness and knowledge of fitness.

Male and female differences regarding the five variables of fitness were also compared. Only one significant relationship was recorded, that being on the involvement variable, between male and female groups.

In this study, differences in age groups were also

compared on the five variables of fitness. It was found that no significant relationship existed between the various age groups.

### ACKNOWLEDGEMENTS

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Gratitude is also extended to Dr. Dale Mood for permission to use his Test of Physical Fitness Knowledge in this paper.

The researcher also extends thanks to the students in the Education 3070 course, who participated as subjects in this study.

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CHAPTER I

INTRODUCTION

## CHAPTER I

### INTRODUCTION

Attempts at discovering, understanding, and ultimately planning for the physiological benefits of physical activity for the individual, have been a distinguishing characteristic of physical education and physical fitness research over the years. With increasing emphasis being placed on fitness at the local, provincial and federal levels, the need for greater insight into fitness related variables, such as involvement in fitness programs, knowledge of fitness, attitude toward fitness and perceived and attained fitness levels has also become apparent. The way in which the individual's fitness level is affected by his involvement, knowledge, attitude, and his perceived fitness levels is an important aspect which is sometimes not taken into consideration when organizing physical fitness activity programs.

Present fitness programs may have to be re-evaluated in order to account for the relationship among the characteristics of perceived fitness, attitude toward fitness, involvement in fitness, knowledge of fitness and actual fitness levels.

The relationship among these characteristics are important in that they may provide the information needed for a re-evaluation and re-construction of fitness programs insuring maximum participation and involvement in fitness activities. If, for example, by analysing a sample of the populations' reasons for abstaining from involvement in a fitness program, we find that the major reason for this non-participation is considered to be lack of time, then awareness of the minute amount of time needed to become involved in the program will help enhance participation and thus actual fitness levels. Likewise, if individuals perceive themselves to be fitter than they actually are, then information concerning actual fitness levels preceeding involvement in a fitness program will help to re-educate the individual and increase participation in fitness activities. The physical educator and fitness instructor must also be concerned with changing the attitude of the low participator by dispersing knowledge of fitness, administering batteries of fitness tests and devising simple fitness tests which can be performed quickly and easily by the unskilled individual. The instructor and physical educator must allow flexibility in his program

to encourage maximum participation and to include the group of individuals who are reluctant to partake of a fitness program.

By evaluating subjects prior to initiation of a program, using a battery of tests including knowledge of fitness, attitude toward fitness, perceived fitness, actual fitness and involvement in fitness programs, the fitness instructor is able to prescribe the most beneficial type of program to be undertaken by the subject, the area of related fitness which should be concentrated on (i.e. if the subject has a low knowledge of his fitness level, then major emphasis should be placed on this aspect). This method for greater participation in the fitness programs may include better advertising, programs for re-education concerning the benefits of a fitness program and dissemination of information regarding fitness tests which may be employed by the individual to determine his level of fitness and the progress of his fitness program.

### Need for the Study

This study attempts to provide information concerning aspects of physical fitness oriented towards improving participation in fitness activities by observing individual's attitude towards fitness, knowledge of fitness, perceived fitness and actual fitness levels. The data obtained through a comparison of these characteristics may provide a guideline in preparing fitness tests and increasing participation of subjects who are reluctant to become involved in fitness activities.

The major need for conducting this study was to gather data pertinent to participation or abstinence in fitness programs.

### Statement of the Problem

The purpose of this study was to compare five characteristics pertaining to physical fitness and to assess the relationships between them. (These five (5) characteristics were: involvement in fitness activities; knowledge of fitness; attitude toward fitness; perceived fitness and attained fitness).

### Hypotheses

Hypothesis - There will be significant relationships among involvement in fitness programs, knowledge of fitness, attitude toward fitness, perceived fitness and attained fitness as characteristics of physical fitness of university students.

Sub Hypothesis 1 - There will be a significant positive relationship between involvement in fitness programs and attitude toward fitness of university students.

Sub Hypothesis 2 - There will be a significant positive relationship between involvement in fitness programs and knowledge of fitness levels of university students.

Sub Hypothesis 3 - There will be a significant positive relationship between involvement in fitness programs and perceived fitness levels of university students.

Sub Hypothesis 4 - There will be a significant positive relationship between involvement in

fitness programs and actual fitness levels of university students.

Sub Hypothesis 5 - There will be a significant positive relationship between knowledge of fitness and attitude toward fitness of university students.

Sub Hypothesis 6 - There will be a significant positive relationship between knowledge of fitness and perceived fitness levels of university students.

Sub Hypothesis 7 - There will be a significant positive relationship between knowledge of fitness and attained fitness levels of university students.

Sub Hypothesis 8 - There will be a significant positive relationship between attitude toward fitness and perceived fitness levels of university students.

Sub Hypothesis 9 - There will be a significant positive relationship between attitude toward fitness and attained fitness levels of university students.

Sub Hypothesis 10 - There will be a significant positive

relationship between perceived fitness levels and attained fitness levels of university students.

Statistical Hypotheses - Significance was tested at the .05 level of confidence.

Limitations of the Study

1. The number of subjects used represented only a small sample of the university population (which represents only a small sample of the total population).
2. There were no norms available for an adequate comparison instrument.
3. There was very limited literature available on the characteristics of perceived fitness and knowledge of fitness.
4. Outside factors such as age and sex were allowed for but stringent restrictions were not considered.
5. This study was confined to education students.

Basic Assumptions - All testing was done under the assumption that each participant realized the importance of co-operation in this study, and that the questions of the inventories



were answered with honesty.

### Definition of Terms

1. Attained Fitness - The level of fitness the subject has presently attained, measured by a fitness test.
2. Attitude toward Fitness - The attitude toward fitness which the subject possesses as measured by a score on an attitude inventory.
3. Body Cathexis - Ones conception of his own body's image.
4. Involvement in Fitness - The amount of involvement in fitness programs as measured by a score on an involvement inventory.
5. Knowledge of Fitness - The level of information regarding fitness which the subject possesses as measured by a score on a test of fitness knowledge.
6. Perceived Fitness - The level of fitness the subject perceives himself to have attained as measured by a score obtained on a questionnaire inventory.

7. Physical Fitness - A combination of medical fitness,  
or body soundness, dynamic fitness,  
or capacity for action and emotional fitness.
8. Physical Fitness Program - Any type of physical  
activity which develops physical  
fitness.
9. Scoring Key - A device containing a numerical value  
for every question of the inventory.

## CHAPTER II

### REVIEW OF LITERATURE

## CHAPTER II

### REVIEW OF LITERATURE

The benefits of physical activity has been an important research area for physical educators over the years. The importance of physical functioning has been delineated in the Human Development Model (6) with an emphasis upon the intergration of a person's physical functioning within the intellectual and emotional spheres of functioning. A key tenet of the model is that increments of functioning in one life sphere can have a positive effect on functioning in other areas.

The characterization and explanation of physical activity from the standpoint of its perceived instrumental value for individuals in our society has long been of interest to psychologists and physical education specialists (2). Claims as to the value of physical activity as a facet of our culture have been numerous, with the major emphasis for analysis placed on attitudes toward physical fitness.

As can be seen from a reveiw of the related literature in this field of study, an exorbitant amount of

information is available on the aspect of attitudes toward physical fitness, whilst minimal amounts are available pertaining to knowledge of fitness and perceived fitness (19).

Social psychologists have been concerned with the concept of attitudes since its introduction in the literature over a century ago. Allport synthesized many definitions and incorporated the key concept of readiness, stating that, "an attitude is a mental and natural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individuals response to all objects and situations with which it is related." (3).

Similarly, Kenyon's definitions included principal attitudinal components stating that an attitude is, "a latent or non-observable, complex, but relatively stable behavioral disposition reflecting both direction and intensity of feeling toward a particular object, whether it be concrete or abstract." (31).

Thurstone (59) defined attitude as, "... the intensity of positive or negative affect for or against psychological objects." More recently, attitude has been defined as, "... a consistency among responses to a specific set of stimuli, or social objects (22);

as a projection onto the evaluative dimension of semantic space (46); as "... the predisposition of the individual to evaluate some symbol or object or aspect of his world in a favourable and unfavourable manner" (29); as "An enduring system of positive or negative evaluations, emotional feelings, and pro or con action tendencies with respect to a social object" (33). Edwards also defined attitude as "the degree of positive or negative affect associated with some psychological object" (16).

In an attempt to reflect contemporary writing on the subject, attitude for this paper will be defined as previously stated by Edwards (16) in this review of literature.

Many varying attitude inventories have been employed when studying attitudes in relation to physical activity. Attitude measurement by the method of equal-appearing intervals was developed by Thurstone (60), as an application of psychophysical technique to scaling and representing an attempt to develop a rational scale.

In the review of various methods of attitude scale development, the Thurstone (60) and Likert (34) methods were found to be used most frequently in the field of physical education. Using the Thurstone method for

developing his measuring instrument, Newson (45) studied annoyances of students in physical education classes. Using the Thurstone method, Carr (7) studied the attitudes expressed by high school freshman girls and found them directly related to their success in physical education. McGee (37) used a combination of the Thurstone and Likert methods in constructing a 70-item attitude scale. Using this scale, McGee compared attitudes of administrators, teachers, and parents toward intensive athletic competition of high school girls. Drinkwater (15) used the Likert technique for constructing an attitude inventory to measure the attitude of high school girls toward physical education as a career for women. Using the same technique, Cutler (13) concluded that student's attitude towards physical education were strongly favourable in California Junior Colleges.

Kenyon (31) formulated and tested a conceptual model for physical activity from which a multi-dimensional scaling approach was developed. The six dimensions subsequently identified were: physical activity as a social experience, as health and fitness, as the pursuit of Vertigo, as an aesthetic experience, as catharsis, and as an ascetic experience. Both a Likert

type inventory and semantic differential scales were constructed to assess attitudes toward physical activity.

Many other scaling instruments were also developed and employed to assess attitudes toward physical activity of some type. These were devised by Wear (62), Richardson (48) and Adams (1).

Attitudinal investigations within the field of physical education have been numerous and varied in focus including examinations of attitudes toward physical education (62), (48), (1); intensive competition (38); sportsmanship (36); and conditioning.

Attitudes have been studied as being linked to various components and aspects of physical activity. Recent approaches have included the study of athletes toward an object of physical activity (31), (44); and attitudes toward the self as object (28), (44). The latter has met with varying success partly because of the complexity of self-attitudes (24), (63).

Other researchers have attempted to validate the assumption that physical fitness contributes to mental and emotional functioning as well as attitude formation. Cureton (12), for example, followed 2,500 adults through a physical conditioning program and,



through interviews and checklists, concluded that the physical program helped people to make friends, relieve tension, and increase energy levels. However, controlled studies (14), (19), (20), seem to indicate that this psychological gain is most apparent for people who are either very unfit physically or very anxious before the physical fitness program. When subjects are young and generally physically fit to begin with, further increases in fitness may not produce psychological gains (58).

Psychological benefits from physical fitness have also been noted for emotionally disturbed groups. Johnson, Fretz, and Johnson (28) observed improvements in self-concept for 74 disturbed children in a six week physical development program. Murphy, Bennett, Hogen, and Russell (42) studied the effects of a twelve month physical fitness program for 93 alcoholics and noted decreases in depression and anxiety on the Minnesota Multi-Phasic Personality Inventory (MMPI). Gary and Guthrie (20) compared 10 chronic alcoholics who jogged a mile a day for 20 days with 10 control subjects and found that joggers showed increased self-esteem and slept better.

McPherson and Yuhosz (39) used an attitude

inventory in a study of the psychological effects of exercise on post-cardiac and normal adult men. The inventory was utilized to determine the intensity of attitudes toward exercise and physical activity before an exercise program, and to determine whether changes in attitudes occurred after a twenty-four week program of graduated exercises. Significant changes in attitude were recorded after a twenty-four week exercise program.

Neale, Sonstroem, and Metz (44) utilized a physical activity attitude inventory containing an Estimation Scale and an Attraction Scale. Estimation items asked the individual to estimate his capabilities at physical activity and could be characterized as a measure of self-esteem regarding physical ability. The Attraction Scale contained items assessing interest in or attraction to vigorous physical activity. The rationale for this inventory would imply that for a person to engage in physical activity, this activity must possess an attraction to him. Furthermore, the person must believe himself capable of achieving a degree of success at the activity. Within the study, no significant differences were found between high-fit and low-fit

groups of adolescent boys in either self-esteem or in level of voluntary physical activity.

Kay and others (30) correlated scores of the Piers-Harris Children's Self-Concept Scale with scores from 6 Youth Fitness tests in 406 seventh, eighth, and ninth grade boys. Only 6 of the 18 coefficients were significant, ranging in size from .18 to .25. Yet, measures of personal interest in sports showed positive and significant coefficients with self-concept in each of the three groups.

An attitude inventory employed by Spears and Dale (56) revealed that college students were generally found to have positive attitudes toward physical education.

As can be concluded from this review of the related literature pertaining to attitudes, there has been much research in this area. The attitude inventory to be used in this study has been devised by selecting ten items from Richardson's attitude inventory (48) and performing discrimination tests on these until a final form of eight items was devised.

An investigation of the related literature revealed that very little has been reported in the area of measuring the knowledge of physical fitness possessed by college students. Two studies (41), (57)

are recorded in which tests were constructed to measure knowledge of physical fitness.

Objective written tests have recently been developed to measure the knowledge gained by college students enrolled in basic instructional classes in physical education. Often, these classes, which are typically part of the requirement for graduation from college are often taken during the freshman year, and cover such aspects as physiology, anatomy, health, and athletic injuries.

Mood (41) has devised a Test of Physical Fitness Knowledge which has provided the most recent attempt to measure knowledge of physical fitness. Although it was constructed primarily as a physical fitness knowledge test of physical education students, Mood provides norms for the fifteen various groups of students to whom the test was administered. Form B of Mood's test was used to collect data for this study.

Numerous researchers have suggested that manipulations of physical fitness through a physical training program can be used to change psychological functioning in predictable directions (9). These researchers have generally been inclined to look only to their physical manipulations for an explanation of the changes

in personal feelings and attitudes. However, the writing of self concept theorists would suggest the possibility of looking at conscious or unconscious perceptions of one's body for the explanation of such changes (17). In other words, some researchers (9) would suggest that there is physical causation of certain psychological characteristics, while others would hold that bodily reactions are cognitively interpreted and intergrated into a consistent psychological reality (17).

In his study on actual and perceived fitness, Heaps (23) reported a correlation of but .10 between self-acceptance scores and actual physical fitness levels. Subjects perception of their fitness, however, obtained coefficients of .27 with actual fitness and partial coefficients (fitness effect controlled) of .32 with self-acceptance. This means that subjects perception of their fitness levels were positively related to feelings of self-acceptance and negatively related to feelings of anxiety about, or concern for bodily functioning. However, the subject's actual fitness levels were found to be only slightly related to the estimates of their level of fitness and were found not to be related to any other self-attitudes studied.

Working with overweight boys in a camp program which included a follow-up study, Rohrbacher (49) found that Self-Cathexis scores remained unchanged, while Body-Cathexis scores reflected positive changes attributed to the program. The correlation coefficient between Body-Cathexis and Self-Cathexis scores during the entire study was .57, a value similar to that obtained in the original research by the test designers (51).

Both Homan and Slavson (26), (53) contend that an individual's self-esteem contributes more to his state of mental health than any other factor. Maslow includes self-esteem as one of four basic human needs (35). Other sources also stress this factor (11), (50).

Self-esteem is not equivalent to self-concept or other self-constructs (54), (63), but is actually an affective self-attitude. (e.g. -- a subjective evaluation of the self having as its basis a feeling of liking or disliking including both direction and intensity (11), (26), (50),).

Collingwood and Willett (9) in a recent article reported that an increase in physical fitness facilitated a more positive self-concept and body-attitude. In turn, the implication was made that physical

training, as a vehicle to increase physical fitness, could function as a key therapeutic mode to rehabilitate clients.

The data on physical fitness, body-attitude and self-concept support the contention that a healthy attitude progresses not only through the mental sphere but also through the physical sphere. In turn, the more positive performances of the experimental group further delineates the facilitative potentials of physical training. The improved self-attitudes could represent an attitudinal consolidation of behavioral gains and could also serve as a spring board for gains in other areas (8).

Yeatts and Gordon (64) recognized an increasing awareness of the importance of ones image in relation to the capacity to perform.

Mussen and Jones (43) found a negative self-concept among adolescent boys who were constantly retarded in physical development. They saw themselves as being "punished" by their parents and peers more often than did early maturers. The data suggests that the early maturers exerted more independent control over their own behavior.

Yeatts and Gordon (64) also found that although



there were no significant sex differences, the males tend to show higher fitness than self-image scores and the females tend to show a higher self-image than fitness score.

Neale, Sonstroem, and Metz (44) in their study on the relationship between physical fitness, self-esteem, and attitude toward physical activity found that the results of the study failed to support the hypothesized relationship between physical fitness and general self-esteem in adolescent boys. One possible interpretation is that the measuring instruments employed in the study were not precise enough to detect the relationship. Nevertheless, the possibility exists that the hypothesized relationship does not, in fact, exist or is very low. If so, one is led to believe that self-esteem in adolescent boys is mainly the result of factors other than physical fitness.

In a review of the related literature in the field of fitness testing, an abundance of instruments for measuring fitness were found. It is beyond the scope of this paper to list all these fitness tests, as this would constitute a bibliography in itself. However, the tests most commonly applied in conjunction with fitness scales will be mentioned.



Sonstoem (55) in his study on attitude testing to examine certain psychological correlates of physical activity, used the Fleishman Basic Fitness Test (18) containing nine components of physical fitness to measure the fitness levels of his subjects.

Collingwood (8) in his study of the effects of physical training upon behavior and self-attitude included a battery of fitness tests to measure fitness levels of his subjects. The tests employed included a pre and post test of: 1). The Step Test to measure working pulse rate (Cardiovascular functioning); 2). Sit-ups and push-ups (Dynamic strength) and 3). The Kraus-Weber series (Minimal fitness level).

Neale, Sonstroem and Metz (44) divided their subjects into high and low fitness groups on the basis of scores on the AAHPER Youth Fitness Test.

Collingwood and Willett (9) in a study on the effects of physical training upon self-concept and body-attitude used a battery of fitness tests to obtain the level of fitness of their subjects. These tests consisted of: 1). Weight; 2). Waist size; 3). Resting pulse rate; 4). Lung capacity; 5). Kraus-Weber test of minimal fitness; 6). Balance tests; 7). Chalk jumps; 8). Push-ups and sit-ups. This was used to

give an approximate measure of fitness.

The fitness test employed in this study was the Canadian Home Fitness Test (4). This test is basically a step test incorporating within it a pulse rate count.

The step test is performed on two eight-inch steps at a predetermined speed depending on the person's age and sex.

Maurice Jette (27) in his study of the Canadian Home Fitness Test as a predictor of maximal oxygen consumption found that there was a relationship between the Canadian Home Fitness test and the Step test. A regression equation was introduced for the computation of the Home Fitness test to predict maximal oxygen consumption.

As can be ascertained from the review of related literature there is much information available on the aspect of attitude toward physical fitness but very limited amounts on the aspects of knowledge of fitness and perceived fitness.

Most of the data support the observation that physical fitness has some influence on developing attitudes whether it be attitudes toward physical fitness or attitudes towards the persons concerned. (e.g. the individual's body, self-esteem and how he perceives

himself. This data also supports the observation that physical fitness contributes to the field of mental and emotional functioning and also to that of changing attitudes.

With respect to perceived fitness and knowledge of fitness, the limited data available is congruent with that on attitudes.

Perceived fitness levels were slightly related to actual fitness levels but highly related to certain aspects of the individual's attitude, such as self-acceptance and negatively related to feelings of anxiety. Perceived fitness is also viewed as being related to the attitudes possessed by the subject.

In observing the available data on knowledge of fitness, it can be seen that there is a reliable and valid measure of physical fitness knowledge, which can be used to evaluate the subject's level of knowledge on fitness.

Since there was no perceived fitness scale available, one was constructed by the author for use in this study.

### CHAPTER III

#### METHODOLOGY

## CHAPTER III

### METHODOLOGY

The purpose of this chapter is to describe the procedures which were followed in the study. It is organized as follows: research design; sample selection; testing procedure; and treatment of data.

#### General Research Design of the Study

The following is an outline of steps taken in carrying out the study.

- 1). An attitude scale to measure attitudes toward fitness was constructed by using eight of the original thirty-eight questions used by Richardson (48) in his study of the attitudes of college students toward physical fitness and exercise.

- 2). A questionnaire was constructed to measure perceived fitness levels of college students. The items were devised from a review of related literature and from consultation with physical education undergraduate students, graduate students and advisors.

- 3). A questionnaire was constructed for the purpose of obtaining personal data, such as age, sex, and student number, as well as related information concerning involvement in fitness programs.

4). The above tests were then administered to college students enrolled in the Education 3070 course at Memorial to measure validity and to obtain a measure of test-retest reliability. They were found to be both valid and reliable measures of attitudes and perceived fitness.

5). The next step was to administer Form B of Mood's (41) test of physical fitness knowledge to the subjects to secure a measure of the subject's knowledge of fitness.

6). The Canadian Home Fitness Test was administered to secure a measure of the subject's actual level of fitness.

7). The four scales were incorporated into one package under the heading "Physical Fitness Questionnaire" and was administered to the experimental group of subjects to collect data for use in this study.

#### Attitude Scale

The questions for the attitude scale were selected from the original thirty-eight used by Richardson (48) in his study of attitudes of college students toward physical fitness and exercise. Of the thirty-eight on the original scale, ten were selected by the author as

being pertinent to the study, and these were administered to thirty-five college students and were changed from a Thurstone Scale to a Likert-type Scale by arranging the answers along a continuum from strongly agree to strongly disagree. Depending on whether the question was stated as being positive or negative. These ten questions were then tested for discrimination by taking the scores of the high group and scores of the low group on each question and performing t-Test of Independent Samples.

The results of these discriminations (Appendix B) show that of the ten items, eight were able to discriminate significantly at the .10 level of confidence. These questions were then tested for reliability by using a one-week, test-retest reliability coefficient. A Pearson Product coefficient of correlation of .666 was found when the questionnaire was administered to a comparable group of twelve college students. The results are shown in Appendix C.

#### Perceived Fitness Scale

The subject's fitness self-estimates were measured by having them complete a physical fitness inventory developed for this study. The inventory consisted of seven questions devised from a review of related

literature and from consultation with physical education undergraduate students, graduate students and advisors. These seven questions were tested for discrimination by administering the inventory to thirty-five college students, and comparing the scores for each question of the high and low groups. The t-test of Independent Samples was used to test for discrimination. As can be seen from Appendix D, all the questions discriminated significantly at the .10 level of confidence.

This same inventory was then presented to another group of college students to test reliability. As can be seen by Appendix E, a one-week test-retest reliability coefficient of .951 was established by use of the Pearson Product Moment Coefficient of Correlation.

#### Knowledge of Fitness Scale

Mood's (41) test of Physical Fitness Knowledge was administered to the experimental group of subjects in order to secure data for this study. Mood constructed two forms of a test of physical fitness knowledge to measure the physical fitness knowledge levels of physical education students. Form B of this test was employed in this study. One hundred and eighty-four



experimental test items, the content of which was based on sixty physical fitness facts secured from recent physical education literature and on opinions of seventy-three members of the research council of AAHPER, were administered to one thousand, three hundred and sixty physical education major students enrolled in thirty-five collegiate institutions in the United States. As a result of item analysis data, two parallel forms of the test was administered. For the purpose of obtaining validity and reliability data and establishing norms, the final test forms were administered to four thousand, one hundred and sixty-seven students enrolled in one hundred and fifty college institutions in the United States. The two final test forms were found to be valid, relatively parallel, and reliable measures of knowledge of fitness. A summary of test statistics for Form B of the test of physical fitness knowledge are shown in Appendix F.

#### Personal Information Questionnaire

A questionnaire was devised to collect personal information regarding the subject, such as age, sex, and student number, as well as data concerning the subject's reasons for becoming involved or not becoming involved with a fitness program. The questionnaire derived

through a review of related literature gathered data pertaining to the subject's perceived level of knowledge concerning the benefits of fitness.

#### Actual Fitness Test

The method employed in this study to measure the actual fitness level of the subjects was the Canadian Home Fitness Test. This test which was devised by Bailey, Shephard and Merivald (4) for Health and Welfare Canada is a useful instrument to be employed in this study because: it does not tax the subject's physical capacity to its limit; it accounts for a large range of age groups; it is simple and easy to understand; it allows for mass testing in an economical time period; and it requires only minimal supervision and equipment.

The test is a modified step test performed on two eight-inch (20.3 cm.) steps. The subject goes up and down the steps at a speed depending on his age, for three minutes. Immediately after stepping exercises the subject counts his pulse rate. Depending on the results of his pulse count, the subject may be instructed to complete a second stepping exercise.

The following procedure should be followed in taking the test:

1). Place the appropriate side of the record on the record player as one side is for males and the other for females.

2). Select the proper starting stepping exercise number for the subject's age and sex from the Physical Fitness Evaluation Chart.

3). Position the record needle on the proper starting band using the Age-Group Exercise Selector.

4). Perform the stepping exercise on the bottom two steps on a staircase with two eight-inch steps.

5). Depending on the subject's pulse count after stepping, the subject may be directed to perform a second, faster stepping exercise.

6). The physical fitness Evaluation Chart is consulted to see if the subject's heart rate classes one as having an undesirable, minimal or satisfactory personal fitness level.

#### Sample Selection

The subjects selected for the study included forty-two male and female students enrolled in the summer semester of Education 3070 course at Memorial University of Newfoundland. The number of males and females and their respective age range is given in Appendix G.

### Testing Procedure

The initial stage in the testing of the subjects involved administering the Question Booklet and Answer Booklet (Appendix H) of the Physical Fitness Questionnaire. The actual fitness testing was completed during class time in which the subjects participated in the Canadian Home Fitness Test. The subjects recorded their own results for the step test by counting their heart rates and recording them on a data sheet.

The subjects were taught to take their pulse rate by the method employed by the Canadian Home Fitness Test. This involved placing the three middle fingers of one hand along the edge of the other wrist just below the base of the thumb and counting the number of beats for ten seconds. Several practise sessions were given in order for the subjects to familiarize themselves with this procedure.

### Treatment of Data

The statistical method used in this research include Spearman Rank Order Correlation Coefficient, F-Test, and t-Test of Independent Samples (Appendix I).

The .05 level of confidence was chosen to determine the significance of each test.

## CHAPTER IV

### RESULTS AND DISCUSSION

## CHAPTER IV

### RESULTS AND DISCUSSION

The sample ( $N = 42$ ) was composed of eight males and thirty-four females ranging in age from twenty years to forty-nine years of age. The number of subjects in each age group and the number of age groups are given in Appendix G.

In an analysis of the collected data, three statistical tests were used. Spearman Rank Order Correlation Coefficient was used to measure the relationships between the five variables of fitness including; knowledge of fitness, attitude toward fitness, perceived fitness, attained fitness, and involvement in a fitness program. The F-Test of Independent Samples was used to determine if there was any significance between and among the sexes and age groups of the subjects. The t-Test of Independent Samples was used to discriminate between questions on the attitude toward fitness scale and perceived fitness scale for the purpose of establishing final forms of these tests.

The standard deviations and means were computed for each characteristic of fitness in order to establish the average performance on each section as well as the variance

of group scores from the established mean, (Table XII).

In an analysis of the data pertaining to the subject's involvement in fitness programs and attitude toward fitness, there was found to be a low significant relationship between these characteristics. The subject's involvement in fitness programs compared with perceived fitness levels revealed that there was no significant relationship between the two.

A comparison of the subject's involvement in fitness programs and subject's knowledge of fitness revealed a significant but low relationship between the two characteristics. Involvement in fitness programs and the subjects actual level of fitness provides a very high significant relationship, (Table I).

TABLE I

Involvement in Fitness Programs  
 compared with Knowledge, Attitude,  
 Perceived and Attained Fitness Levels

<u>Characteristics Correlated</u>	<u>Correlations</u>
Involvement and Attitude	.322*
Involvement and Perceived Fitness Level	.287**
Involvement and Knowledge of Fitness	.379*
Involvement and Actual Fitness Level	.808*

NOTE: At .05 level, .304 is needed for significance.

\* significant at .05 level.

\*\* not significant.

In an analysis of the data pertaining to the subjects attitude toward fitness and his/her perceived fitness level, knowledge of fitness and actual fitness level, the following results were recorded: attitude toward fitness and perceived fitness levels were found to possess a significant but low relationship. Attitude toward fitness and knowledge of fitness were found to possess no significant relationship. Attitude toward fitness and actual fitness levels were found to possess a low significant relationship. (Table II).



TABLE II

Attitude toward Fitness correlated with  
 Knowledge, Perceived Fitness  
 and Attained Fitness Levels

<u>Characteristics Correlated</u>	<u>Correlation</u>
Attitude and Perceived Fitness	.431*
Attitude and Knowledge of Fitness	.188**
Attitude and Actual Fitness Levels	.374*

NOTE: At the .05 level, .304 is needed for significance.

\* significant at the .05 level.

\*\* not significant

In an analysis of the data pertaining to perceived fitness levels and actual levels of fitness, the following results were recorded: the perceived fitness levels and knowledge of fitness levels of the subjects were found to possess a low significant relationship. Perceived fitness levels and actual fitness levels of the subjects were found to possess no significant relationship. (Table III).

TABLE III

Perceived Fitness Levels correlated with  
Knowledge of Fitness and Actual Fitness Levels

<u>Characteristics Correlated</u>	<u>Correlations</u>
Perceived Fitness and Knowledge of Fitness	.318*
Perceived Fitness and Actual Fitness Levels	.287**

NOTE: At the .05 level, .304 is needed for significance.

\* significant at .05 level.

\*\* not significant.

In an analysis of data pertaining to the subject's knowledge of fitness and actual level of fitness, no significant relationship was found to exist between the two Characteristics. (Table IV).

TABLE IV

Knowledge of Fitness correlated with  
Actual Fitness Levels

<u>Characteristics Correlated</u>	<u>Correlation</u>
Knowledge of Fitness and Actual Fitness Levels	.192**

NOTE: At the .05 level, .304 is needed for significance.

\* significant at .05 level.

\*\* not significant.

In the analysis of data, male and female differences related to the five characteristics; involvement, attitude, perceived fitness, knowledge of fitness, and actual fitness, were studied. The difference between male and female subjects on involvement in fitness programs was found to be significant at .05 level. (Males had a mean of (5), females had a mean of (3.8) ). All other differences between males and females were found not to be significant.

TABLE V

Difference between Male and Female Subjects  
on the Five Characteristics  
observed in the Study

<u>Characteristics</u>	<u>Obtained F</u>
Involvement	6.700*
Attitude toward Fitness	.056**
Perceived Fitness	1.245**
Knowledge of Fitness	1.522**
Actual Fitness Levels	.124**

NOTE: At the .05 level, the F value required for significance was 4.08

\* significant at .05 level.

\*\* not significant.

In the analysis of data, age group differences related to the five characteristics: involvement, attitude, perceived fitness level, knowledge of fitness and actual fitness levels were compared.

In the relationships, no significant difference was found between the characteristics.

In the section of the questionnaire pertaining to involvement in fitness programs, the subjects were asked to present their reasons for participating or not participating in a fitness program. The number of participants out of the total population ( $N = 42$ ) was twenty-two, the number of non-participants equalled twenty. Of the twenty-two who were involved in a fitness program, fifteen selected "To become fit and gain a knowledge of fitness" as the major reason for becoming involved in a fitness program.

TABLE VI

Reasons for Involvement in Fitness Programs

<u>Reason for Involvement</u>	<u>Subject</u>
To become fit and gain a knowledge of fitness	15
To improve health	4
Because of involvement with a Physical Education Program	3
	$N = 22$

Out of the twenty subjects who had never participated in a fitness program, fourteen listed "no time" as the major reason for not becoming involved in a fitness program. The remaining six subjects and their reasons for abstaining from involvement are given in Table VII.

TABLE VII

Reasons for not Participating in Fitness Programs

<u>Reason for Non-Participation</u>	<u>Subjects</u>
No time	14
No program available	3
Did not think it was worth the effort	1
Job does not require it	1
Thought oneself fit enough	1
	(N = 20)

Male and female differences were also analyzed regarding the characteristics of involvement in a fitness program. Of the eight male subjects in the study, three had been involved in a fitness program, and five had not participated in a fitness program. The rationale for the subjects participation or abstinence from the fitness programs are given in Tables VIII and IX.

TABLE VIII

Male Subject's Reasons for Involvement in a  
Fitness Program

<u>Reason for Involvement</u>	<u>Subjects</u>
To become fit and gain a knowledge of fitness	3 (N = 3)

TABLE IX

Male Subject's Reasons for Abstaining from  
Involvement in a Fitness Program

<u>Reason for Abstaining</u>	<u>Subjects</u>
No time	1
Fit enough	1
Job does not require it	1
No program available	2 (N = 5)

Of the thirty-four females involved in the study, nineteen had been involved in a fitness program, and fifteen had not been involved in a fitness program. The rationale for the subjects participating or abstaining from involvement in a fitness program are given in Tables X and XI.

TABLE X

Female Subject's Reasons for Involvement in a  
Fitness Program

<u>Reason for Involvement</u>	<u>Subjects</u>
To become fit and gain a knowledge of fitness	12
To improve health	4
Because of involvement in a physical education course	3
	(N = 19)

TABLE XI

Female Subject's Reasons for Abstaining from  
Involvement in a Fitness Program

<u>Reason for Abstaining</u>	<u>Subjects</u>
No time	13
No program available	1
Job does not require it	1
	(N = 15)

TABLE XII

Summary of Test Statistics for the  
Five Characteristics observed in this Study

<u>Section</u>	<u>Standard Deviation</u>	<u>Mean</u>
Involvement in Fitness	1.04	4.11
Attitude toward Fitness	2.95	28.52
Knowledge of Fitness	3.86	16.02
Perceived Fitness Level	9.55	24.35
Actual Fitness Level	3.22	27.23



## Discussion

As shown by the presentation of the results, there were many relationships considered regarding the collected data. To facilitate organization, the discussion of results was structured in the following manner: interrelationships of the five characteristics of fitness observed in the study, male and female differences related to the five characteristics of fitness, age differences related to the five characteristics, and a discussion of the reasons for participating or abstaining from participating in a fitness program.

### Interrelationship of the Five Characteristics of Fitness

As shown by Tables I, II, III, and IV, six significant relationships existed among the five characteristics of: involvement in fitness programs, attitude toward fitness, perceived fitness level, knowledge of fitness and actual fitness level.

Involvement in fitness programs had a significant relationship when compared to attitude, knowledge and actual fitness levels. This finding would tend to support the view presented by Neale, Sonstroem and Metz (44) that in order for a person to participate in a physical activity, it must present an attractive attitude to him.

Since very little information was available regarding knowledge of fitness, it might be assumed that involvement in fitness activities has some significant effect on knowledge of fitness; or that knowledge of fitness leads to involvement.

The hypothesis that involvement in fitness programs and actual fitness levels have a significant relationship between them, is upheld by Collingwood and Willetts' (9) research which implied that physical training as a vehicle to increase physical fitness, could also function as a key therapeutic mode to rehabilitate clients. It has long been known that repeated physical activity, especially in the form of physical exercise is of great benefit to the cardiovascular system and is necessary for keeping the body healthy. The high significant relationship between involvement in fitness programs and the actual fitness level of the subject's involvement in this study is evidence that participation in physical activity enhances ones fitness level or that participation in physical activity increases when the individual is fit.

When attitude toward fitness was correlated with perceived fitness levels, knowledge of fitness and actual fitness levels, the only characteristic it did

not correlate significantly with was knowledge of fitness. The fact that attitude toward fitness and perceived fitness levels correlated significantly, supports the research undertaken by Neale, Sonstroem, and Metz (44) where Estimation and Attraction scales were administered to the subjects to measure interest or attraction to vigorous physical activity and self-esteem regarding physical ability. These researchers (44) found that if the subject was attracted to the physical activity or perceived himself to be good at that activity then this would affect his attitude toward the activity.

The fact that attitude toward fitness and knowledge of fitness did not correlate significantly is indicative that how the subjects felt about fitness, either positively or negatively, was not related to their knowledge regarding physical fitness.

From the significant correlation between the characteristics of attitude toward fitness and actual fitness levels, we may assume that in order for the subjects actual fitness level to improve, a favourable attitude toward physical fitness and toward involvement in fitness must be present.

A relationship between perceived fitness levels and actual fitness which was not significant supports

the results found by Heaps (23) in his study of actual and perceived fitness levels. He found a correlation of .10 between self-acceptance scores and actual physical fitness levels. Subject's perception of his fitness levels were positively related to feelings of self-acceptance and negatively related to feelings of anxiety about bodily functioning. The subjects actual fitness levels were found to be only slightly related to the estimates of their level of fitness and were found not to be related to any other self-attitudes studied.

From the relationship between knowledge of fitness and actual fitness levels, which was not significant, we may assume that a subject's actual level of fitness, be it high or low, has no noticable effect on how much one actually knows regarding fitness material.

#### Male and Female Differences on the Five Characteristics of Fitness

In an analysis of data between males and females on the five characteristics of, involvement in fitness programs, attitude toward fitness, knowledge of fitness, perceived fitness levels and actual fitness levels, there was found to be a significant difference on the involvement characteristics between these two groups. The

differences between males and females on the remaining four characteristics were not significant.

The significant difference between males and females on the involvement characteristic showed males with a higher participation rate than females. (Mean for males for participation was 5, while the mean for females was 3.8).

#### Reasons For and Against Involvement in a Fitness Program

In an analysis of data concerning participating or abstaining from participation in a fitness program, it was observed that of the forty-two subjects involved in the study, twenty-two had been involved primarily for the reason of "becoming fit and gaining a knowledge of fitness," and twenty were not involved in fitness programs because they "did not have the time to participate."

From this data we can assume that a restructuring of the individual's attitude regarding physical fitness (i.e. placing it in a higher priority bracket and convincing the individual to devote more time to it), and rescheduling physical fitness programs to accommodate the individual's timetable will allow for greater participation in fitness programs. It can also be concluded that since the major reason for participation

in fitness programs is to become fit and gain a knowledge of fitness, a greater emphasis should be placed on educating the individuals of the benefits of becoming fit and providing them with information concerning fitness.

Since most of the data accumulated by past researchers on these characteristics of fitness has concentrated on developing reliable and valid measures of these characteristics and not with the application of these measuring instruments, it is only possible to make assumptions from the relationships observed in this study.

## CHAPTER V

### SUMMARY, RECOMMENDATIONS AND CONCLUSIONS

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#### Summary

The purpose of this study was to determine the relationship among the characteristics of involvement in fitness programs, knowledge of fitness, perceived fitness and actual fitness levels of university students. The subjects age as well as sex were also compared on these characteristics.

The statistical analysis employed in this study was Spearman's Rank Order Correlation Coefficient which enabled the researcher to determine if there was a significant relationship among the five (5) variables of fitness.

Significance beyond the .05 level was found on the characteristics of involvement and attitude, involvement and knowledge, involvement and actual fitness levels and perceived fitness and knowledge of fitness.

The F-Test was used to determine if there was any significant difference between and among the sexes and age groups of the subjects. A positive significant relationship beyond the .05 level was recorded on the



characteristics of involvement in fitness programs. No significant relationships were recorded when age groups of the subjects were compared on the characteristics of involvement in fitness programs, attitude towards fitness, knowledge of fitness, perceived and attained fitness levels.

### Conclusions

The results obtained led to the conclusion that there were significant differences in involvement in fitness and attitude toward fitness, involvement in fitness and knowledge of fitness, involvement in fitness and actual fitness level, attitude toward fitness and perceived fitness, attitude toward fitness and actual fitness levels, and perceived fitness and knowledge of fitness.

Therefore:

Sub Hypothesis	1 - Accepted
Sub Hypothesis	2 - Accepted
Sub Hypothesis	3 - Rejected
Sub Hypothesis	4 - Accepted
Sub Hypothesis	5 - Rejected
Sub Hypothesis	6 - Accepted
Sub Hypothesis	7 - Rejected

Sub Hypothesis 8 - Accepted

Sub Hypothesis 9 - Accepted

Sub Hypothesis 10 - Rejected

Hypotheses tested at .05 level of confidence.

The significant relationships presented by this study provide information which may be of value to future researchers when studying fitness related characteristics. As can be seen from the results, a significant relationship exists between involvement in fitness programs and attitude toward fitness. This data may aid future programs by providing information which may enable the fitness instructor to attain maximum involvement (participation) in his program by appealing to the individual's attitude toward fitness. The relationships among involvement and attitude and involvement and actual fitness levels, is evidence that involvement (participation) in fitness programs is affected by how the individual feels about physical activity as well as how much he really knows about the benefits of fitness.

In conclusion, it can be stated that in order to get greater involvement (participation) in fitness programs, the individual has to be made conscious of the benefits of fitness, he must be made to realize

that only a minute amount of time is required in order to participate in a fitness program, and an attempt to change his attitude toward fitness must be achieved.

#### Recommendations for Future Studies

The following recommendations should be taken into consideration by future researchers who may do future studies of fitness related characteristics.

1. Since "no time" was selected as the major reason for non-participation in a fitness program, a study should be undertaken comparing the duration of fitness programs with the amount of participation by both sexes in fitness programs.
2. Since "to become fit and gain a knowledge of fitness" was selected as the major reason for participation in a fitness program, a study should be undertaken to determine which part of the statement has the greatest influence, (i.e. Was "to become fit" the major reason or was "to gain a knowledge of fitness" the major reason for participation in a fitness program).
3. A study should be completed to devise more accurate measuring devices in the areas of attitudes, perceived fitness and involvement in fitness programs.

Recommendations for this Study

Within the limitations of this study, the conclusions arrived at were considered valid. However, there are a number of areas which need more emphasis before any practical implications can be suggested.

1. A study similar to this should be conducted using a larger sample of the overall population and involving a large number of age groups. This would enable the researcher to produce norms and provide accurate conclusions regarding factors which ultimately affect actual fitness levels.
2. A complete study on male and female subjects should be conducted to enable the researcher to specify the differences between the sexes and to create norms for each sex.
3. A more accurate physical fitness test (i.e. Astrand's Bicycle Ergometer Test) should be used when assessing the subjects actual fitness level.

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APPENDICES

APPENDIX A

A Study to Compare Involvement in Fitness  
Programs, Knowledge of Fitness, Attitude towards  
Fitness, Perceived Fitness and Attained Fitness  
Levels of University Students

by

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A Thesis submitted in partial fulfillment  
of the requirements for the degree of  
Master of Physical Education

School of Physical Education  
Memorial University of Newfoundland

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St. John's

Newfoundland

## APPENDIX B

PEARSON PRODUCT MOMENTATTITUDE SCALE

STUDENT	1 <sup>st</sup> . TEST	X <sup>2</sup>	2 <sup>nd</sup> . TEST	Y <sup>2</sup>	XY
1	29	841	29	841	841
2	32	1024	32	1024	1024
3	29	841	31	961	899
4	32	1024	32	1024	1024
5	30	900	30	900	900
6	26	676	28	784	728
7	26	676	30	900	780
8	31	961	28	784	868
9	28	784	30	900	840
10	26	676	28	784	728
11	<u>26</u>	<u>676</u>	<u>26</u>	<u>676</u>	<u>676</u>
	315	9079	324	9578	9308



## APPENDIX C

t-TESTATTITUDE TOWARDS FITNESS SCALE

QUESTION NUMBER	LEVEL OF SIGNIFICANCE
1	.485**
2	2.450*
3	2.450*
4	1.405*
5	1.634*
6	3.575*
7	.731**
8	2.450*
9	2.450*
10	3.102*

NOTE: At the .10 level, 1.397 is needed for significance.

\* significant at .10 level.

\*\* not significant (and are disregarded).

## APPENDIX D

t-TESTPERCEIVED FITNESS SCALE

QUESTION NUMBER	LEVEL OF SIGNIFICANCE
1	2.63*
2	3.13*
3	5.78*
4	3.20*
5	2.62*
6	5.00*
7	2.89*

NOTE: At the .10 level, 2.01 is needed for significance.

\* significant at .10 level.

\*\* not significant (and are disgarded).

## APPENDIX E

PEARSON PRODUCT MOMENTPERCEIVED FITNESS SCALE

STUDENT	1 <sup>st</sup> . TEST	X <sup>2</sup>	2 <sup>nd</sup> . TEST	Y <sup>2</sup>	XY
1	16	256	17	289	272
2	17	289	17	289	289
3	18	324	18	324	324
4	18	324	16	256	288
5	17	289	15	225	255
6	14	196	14	196	196
7	9	81	10	100	90
8	13	169	12	144	156
9	14	196	13	169	182
10	19	361	19	361	361
11	<u>10</u>	<u>100</u>	<u>10</u>	<u>100</u>	<u>100</u>
	165	2585	161	2453	2513

## APPENDIX F

SUMMARY OF TEST STATISTICS  
FOR FINAL FORMS OF TEST OF  
PHYSICAL FITNESS KNOWLEDGE

STATISTIC	FORM A	FORM B
Mean	32.70	32.15
Standard Deviation	7.03	7.17
Standard Error of Measurement	3.48	3.50
Mean Difficulty	.54	.54
Mean Discrimination	.32	.33
Reliability	.74	.75

## APPENDIX G

PARTICIPANTS IN THE STUDY

AGE GROUP	NUMBER OF SUBJECTS IN AGE GROUP	SEX GROUPS
20	2	F
22	3	2 F, 1 M
23	2	F
24	7	6 F, 1 M
25	3	2 F, 1 M
26	3	2 F, 1 M
27	4	F
28	3	1 F, 2 M
30	1	F
31	1	F
32	4	3 F, 1 M
33	3	2 F, 1 M
35	1	F
36	1	F
38	1	F
39	1	F
40	1	F
49	1	F

APPENDIX H  
QUESTIONNAIRE  
AND  
ANSWER BOOKLET

**DIRECTIONS .... Read Carefully:** Below you will find some statements about Physical Fitness. We would like to know how you feel about each statement. There are four parts to this questionnaire. In each section you are asked to write your answers on the answer booklet provided. Please be certain that you are answering the question in the correct answer space. The pages of the answer booklet are labeled to coincide with the question booklet. Please do not write on the question booklet. Below you will find the directions for each section.

### SECTION A

Here you are asked to select the most appropriate answer and check it on the answer sheet. You are also asked to answer only one of the sections, either yes or no. NOTE: On the answer sheet, answers 1 to 3 are for the Yes section. Answers 4 to 6 are for the No section.

### SECTION B AND C

In these sections you are asked to (A) Read each statement carefully, (B) Go to the answer booklet, and (C) opposite the number of the statement place an "X" in the space which is beside the word (or words) which best expresses your feelings about the statement. If you agree with a statement then decide whether to put an "X" under "agree" or "strongly agree." The same is true for "disagree." Try to avoid placing an "X" under "undecided" in very many instances.

### SECTION D

In this section you are to (A) read each statement carefully, (B) Go to the answer booklet, and (C) opposite the number of the statement circle the correct answer. ie. If the correct answer for question 1 is "A" then you circle "A".

Please note, this is not a test and in no way will it affect your grade on any course. Thank you for your co-operation.

SECTION A

Have you ever undertaken a Fitness Program oriented toward making yourself fitter?

IF YES	IF NO
1. Were you aware of the health benefits of a fitness program when you started the program?	4. Are you aware of the health benefits of a physical fitness program.
2. What level of fitness did you possess before starting the fitness program?	5. Concerning a knowledge of the benefits of fitness, I feel mine is:
3. What was the major reason for starting the fitness program?	6. What was the major reason for you never starting a fitness program.
A. Because it would be fun B. Because my friends started C. To improve my health D. On a doctors recommendation. E. To become physically fit and gain a knowledge of fitness. F. Because of my involvement with a physical education program. G. Because of influence of participation through radio and T.V. H. Other, please specify.	A. I think I am fit enough B. I don't think it is worth the effort C. I don't have the time D. My job doesn't require that I be physically fit E. Being fit would not necessarily mean I would enjoy life anymore F. My Doctor prevents participation in fitness activities for medical reasons G. None of my friends are participants in a fitness program H. Other, please specify.



SECTION B

1. Man has out-grown the need for physical fitness programs.
2. Physical fitness is not worth the effort required.
3. Physical activity should not be stressed so much in our present culture.
4. Physical fitness activity is unnecessary.
5. Physical fitness is a most important aspect of life.
6. Physical fitness activities benefits everyone who participates.
7. Physical fitness activity programs should be stressed.
8. Physical fitness activity is a "must" in today's world.

SECTION C

1. On a physical fitness scale, I would rate myself as being:
2. Others would rate me as being:
3. I feel I could improve my fitness level from:
4. In my group of friends, I feel I am:
5. I have thought about starting a program to improve my fitness:
6. When walking upstairs with others, I find I can do it:
7. My Personal fitness level is:

SECTION D

1. Which of the following best describes circuit-training?
  - (a) A series of activities of progressively greater difficulty.
  - (b) A series of activities performed at different stations.
  - (c) A selection of exercises that are performed in a prescribed sequence.
  - (d) A method of training in which the degree of intensity of running is altered as the distance is covered.
2. Participation in vigorous physical activity would be most beneficial for immediate alleviation of what kind of fatigue?
  - (a) Chronic
  - (b) Active
  - (c) Mental
  - (d) Physical
3. What attribute of a muscle is enhanced most by an increase in the number of functioning capillaries?
  - (a) Static strength
  - (b) Dynamic strength
  - (c) Speed
  - (d) Endurance
4. What is generally accepted as the approximate number of calories per day needed for a 20 to 35 year-old man who does sedentary work?
  - (a) 500 - 1000
  - (b) 2000 - 3000
  - (c) 5000 - 6000
  - (d) 8000 - 9000
5. Which of the following is the best example of a formal or specific warm-up activity?
  - (a) Doing push-ups prior to engaging in a wrestling match.
  - (b) Swinging a weighted bat just before batting in a baseball game.
  - (c) Doing the "jumping jacks" exercise before running the half-mile.
  - (d) Doing stretching exercises before swimming a fifty-yard race.
6. Evidence that participation in regular vigorous activity reduces the level of cholesterol in the body would be most significant for the reduction in occurrence of what ailment?
  - (a) Apoplexy.
  - (b) Chronic fatigue
  - (c) Atherosclerosis
  - (d) Obesity

7. Which of the following is not an acceptable cause of muscle hypertrophy resulting from exercise?
- (a) An increase in the size of the existing muscle fibers.
  - (b) An increase in the number of the nerve cells in the muscle.
  - (c) An increase in the number of capillaries serving the muscle.
  - (d) The growth of latent or unused muscle fibers.
8. What is the chief limitation of calisthenics as a means of developing physical fitness?
- (a) They tend to become boring and monotonous.
  - (b) They tend to develop only specific parts of the body.
  - (c) They are ineffective in developing neuromuscular skill.
  - (d) They are ineffective in developing muscular endurance
9. What is an acceptable explanation of why regular, vigorous exercise appears to aid in reducing the incidence of cardiovascular disease?
- (a) The increase in the number of muscle fibers.
  - (b) The increase in desirable blood constituents.
  - (c) The increase in the collateral circulation of the heart
  - (d) The decrease in caloric intake resulting in lower body weight
10. An Olympic long distance runner would be most likely to have which of the following somatotype ratings?
- (a) 244
  - (b) 373
  - (c) 532
  - (d) 642
11. During general weight loss, fat will be removed from what part of the body?
- (a) The areas having the greatest initial deposit
  - (b) The areas being exercised most often
  - (c) The abdominal region
  - (d) Equally from the fat deposits of the entire body
12. If knowing the principles of weight training promotes the learning of isometric principles, what phenomenon is taking place?
- (a) Reafference
  - (b) Reminiscence
  - (c) Passive learning
  - (d) Positive transfer
13. What principle must be true to support the claim that participation in sports develops many desirable qualities (i.e. courage, determination, self-control, etc.)?
- (a) Sportsmanship is retained for long periods of time.
  - (b) The participants are initially positively motivated.
  - (c) The law of generality applies to sports participation.
  - (d) There is transfer from sports to other aspects of life.

14. When air temperature is above that of the body and the relative humidity is low, how is most heat lost?

- (a) Convection
- (b) Radiation
- (c) Conduction
- (d) Evaporation

15. How does the heart rate of a physically fit person compare to that of a physically unfit person during various states of exertion?

	<u>At Rest</u>	<u>Moderate Exercise</u>	<u>Exhaustive Exercise</u>
(a)	Slower	Slower	Same
(b)	Same	Same	Faster
(c)	Slower	Faster	Faster
(d)	Same	Slower	Faster

16. What vitamin makes possible the absorption of calcium?

- (a) Vitamin A
- (b) Vitamin B
- (c) Vitamin C
- (d) Vitamin D

17. Would one expect more improvement in an endurance event or in a sprint type event as a result of training at high altitudes?

- (a) Endurance, because sprint type events depend on oxygen debt
- (b) Endurance, because altitude training decreases muscular strength
- (c) Sprint, because altitude training increases myoglobin in the muscle
- (d) Sprint, because altitude training increases hemoglobin content of the blood.

18. By what means does the SBX plan of the Royal Canadian Air Force allow for differences in individual fitness needs?

- (a) Providing a different starting level for each age group.
- (b) Allowing the selection of a variety of charts of exercise
- (c) Providing for increasing repetitions and difficulty
- (d) Allowing the selection of a variety of exercises on each of several charts

19. What does the current research indicate concerning the value of mental practice?

- (a) Mental practice is effective but less so than physical practice.
- (b) Mental practice is of more value to the beginner than the skilled performer
- (c) Mental practice is as effective as physical practice
- (d) Mental practice is of very little value as a learning technique

20. What nervous system innervates skeletal muscle?
- (a) Autonomic
  - (b) Central
  - (c) Parasympathetic
  - (d) Peripheral
21. Which of the following is of least value as an ergogenic aid for muscular work?
- (a) Cocaine
  - (b) Hormones
  - (c) Gelatin
  - (d) Caffeine
22. What could be the purpose of a discussion of the differences between a fit and an unfit individual?
- (a) To increase reminiscence
  - (b) To improve attitudes
  - (c) To increase motivation
  - (d) To improve retention
23. The greatest proportion of muscle tissue in the body is of what type?
- (a) Visceral
  - (b) Involuntary
  - (c) Smooth
  - (d) Striated
24. Which of the following is not a-function of the skeletal system?
- (a) Production of red blood cells
  - (b) Production of white blood cells
  - (c) Protection of the spinal cord
  - (d) Provision of surfaces for tendon attachment
25. For which of the following is the excretory system most directly responsible during exercise?
- (a) Heat dissipation
  - (b) Protein production
  - (c) Glycogen storage
  - (d) Endocrine control
26. If you were designing a physical fitness program for a relatively unfit individual, should you set the initial goals high or low?
- (a) Low, because if the initial goals are met the individual would be motivated to continue the program
  - (b) Low, to avoid possible injury to the individual
  - (c) High, because research indicates that the higher goals are set initially the more likely they will be attained.
  - (d) High, so even if the individual falls short of his goals, some progress will have been made

27. What are the characteristics of lordosis?
- (a) Round shoulders
  - (b) Lateral curvature of the spinal column from left to right or vice versa
  - (c) Increased convexity of the thoracic spine
  - (d) Excessive hollowness of the lumbar area resulting in a swaybacked appearance
28. What type of test item is least likely to appear in a physical fitness test battery?
- (a) Agility
  - (b) Strength
  - (c) Flexibility
  - (d) Balance
29. For which of the following is knowledge of results least important?
- (a) Improvement
  - (b) Changing attitudes
  - (c) Increasing motivation
  - (d) Learning
30. When giving verbal instructions to a beginner attempting to learn a new skill what should be emphasized?
- (a) The purpose of the skill
  - (b) Accurate instructions rather than hints
  - (c) A few simple and practical features
  - (d) The mechanical principles of the task
31. How do authorities explain the fact that participants in traditional programs of physical education are not apt to continue to participate in vigorous physical activity?
- (a) Instruction in self-testing activities has not been adequately provided
  - (b) Too much stress has been placed on the value of athletic competition
  - (c) Knowledge of the physiological consequences of physical inactivity has not been taught
  - (d) Team activities are emphasized too early in most education curriculums
32. Which of the following is not an immediate effect of exercise?
- (a) Increased rate of breathing during exercise
  - (b) Dilation of capillaries in muscles
  - (c) Increased flow of blood to muscles
  - (d) An increase in the mechanical efficiency of the respiratory system
33. What is the basic principle underlying the development of physical fitness?
- (a) The overload principle
  - (b) The principle of readiness
  - (c) The aerobic principle
  - (d) The principle of transfer



34. Why does participation in strenuous activity result in loss of water from the body?
- (a) The reduction of body water causes the blood to become more efficient in transporting oxygen
  - (b) The water is used in evaporation to help maintain body temperature
  - (c) Perspiring helps to carry metabolic waste products out of the body.
  - (d) The water removes sodium and other minerals from the body to maintain electrolytic balance
35. What connects muscles to bones?
- (a) Fascia
  - (b) Ligaments
  - (c) Tendons
  - (d) Cartilages
36. What was the most influential factor leading to the establishment of a national physical fitness council in 1956?
- (a) The results of tests of strength and flexibility administered to American and European children
  - (b) The high rejection rate on the Army preinduction physical examination
  - (c) The realization that modern contrivances have contributed to the lack of physical fitness in American youth
  - (d) The impact of television sports coverage, causing people to spectate rather than participate in sports
37. Throughout history, fitness levels generally have declined when which of the following became the dominant factor influencing people's behavior?
- (a) Religion
  - (b) Communism
  - (c) Nationalism
  - (d) Feudalism
38. On what personality factor would athletes be expected to score higher than non-athletes?
- (a) Anxiety
  - (b) Intelligence
  - (c) Social insight
  - (d) Extroversion
39. Which of the following most often appears in definitions of physical fitness?
- (a) The ability to control coordinated body movements skillfully
  - (b) The ability to perform sustained physical work
  - (c) The names of the components that make up overall physical fitness.
  - (d) The ability to complete a normal day's physical requirements



40. What is the main reason why many different test batteries have been constructed for measuring physical fitness?
- (a) No national group exists to coordinate the many efforts made to construct a measure of fitness
  - (b) Physical fitness batteries vary for different age groups
  - (c) A lack of agreement exists concerning a definition of physical fitness
  - (d) The facilities and equipment available for taking measurements vary widely
41. Which test reveals the most information regarding an individual's physical fitness level?
- (a) A muscular strength test
  - (b) A maximal oxygen uptake test
  - (c) An anthropometric and body mechanics appraisal
  - (d) A test to determine vital capacity
42. Which of the following is not primarily a test of cardiorespiratory capacity?
- (a) The Sargent Physical Test of a Man
  - (b) Balke's Standardized Treadmill Test
  - (c) The Harvard Step Test
  - (d) The Schneider Pulse Ratio Test
43. Each of these changes in the blood characteristic of a resting man might be claimed to result from regular exercise. Which is best supported by research?
- (a) A decrease in total blood volume which decreases resistance to blood flow through the vessels
  - (b) An increase in red blood cells which increases the oxygen carrying capacity
  - (c) An increase in blood coagulation which aids in blood vessel repair
  - (d) An increase in white blood cells which increases resistance to disease
44. What is an important consequence of the fact that man, in comparison to other animals, is born with few innate behavior patterns?
- (a) Man is capable of adapting and flourishing in a wide variety of environment
  - (b) Man's tendencies toward antisocial behavior must be controlled
  - (c) Man is able to develop both a competitive and a cooperative attitude
  - (d) Man's gregarious tendencies are reduced
45. What aspect of life in the United States is most responsible for the physical fitness level of our general population being lower than that of the people in many other nations?
- (a) Utilization of labor-saving devices
  - (b) Inefficient use of public facilities
  - (c) Reduction of the work-week
  - (d) Inadequate promotion of physical fitness in school physical education classes

46. What is the current conclusion regarding the relationship between social status and athletic achievement?
- (a) There is a positive relationship between the two factors except among young children
  - (b) The correlation between the two factors is not stable enough to indicate a trend
  - (c) There is a positive relationship between the two factors at all ages
  - (d) There is a slightly negative relationship between the two factors
47. What change, if any, occurs to a muscle under isometric contraction?
- (a) The muscle shortens and becomes wider
  - (b) The muscle lengthens and becomes narrower
  - (c) The muscle shortens and becomes narrower
  - (d) The muscle length does not change
48. What important by-product is formed during the oxidation of foods in the body?
- (a) Protein
  - (b) Water
  - (c) Sodium chloride
  - (d) Oxygen
49. Which of the following is used to classify individuals into fitness levels in the Aerobics exercise program developed by Dr. Kenneth Cooper?
- (a) Age
  - (b) A mile run for time
  - (c) A somatotype rating
  - (d) A twelve-minute run for distance
50. What is the most serious limitation of the standing-bending-reach test for measuring flexibility?
- (a) The test is specific to one group of muscles
  - (b) The test is not a reliable measure of flexibility
  - (c) The test is not a valid measure of flexibility
  - (d) The time and equipment necessary to administer the test are prohibitive
51. A high concentration in the blood of what substance has the most pronounced inhibitory effect on neuromuscular performance?
- (a) Cholesterol
  - (b) Adrenaline
  - (c) Antigens
  - (d) Hydrogen ions
52. Which of the following activities, even if undertaken daily, would be considered insufficient as an exercise program for raising the fitness level of the average college male student?
- (a) A game of handball
  - (b) A game of tennis
  - (c) A circuit-training workout
  - (d) An isometric exercise workout

53. In which of the following events would performance most likely be limited by depletion of energy stores?
- (a) A weight lifting contest
  - (b) Marathon running
  - (c) Swimming 200 yards
  - (d) Sprinting 100 yards
54. What benefit derived from regular participation in vigorous physical activity has been most conclusively substantiated?
- (a) Regular activity lowers the cholesterol level in the blood
  - (b) Training increases the size and functional capacity of the digestive system
  - (c) Regular exercise increases longevity
  - (d) Physical activity reduces the incidence of cardiovascular diseases
55. What effect, favorable to physical activity, may be attributed to the action of the hormone thyroxin?
- (a) An increase in water reabsorption in the kidneys
  - (b) An increase in the rate of the contraction of the heart
  - (c) An increase in metabolic activities of the cells
  - (d) Adjustment of electrolyte balance
56. Which of the following is least likely to result from a training program designed to increase muscular endurance?
- (a) An increase in the number of capillaries in the muscle
  - (b) Maximal enlargement of the muscle
  - (c) An increase in ability of the muscle to store glycogen
  - (d) A slight increase in muscular strength
57. Which of the following is most likely to occur with the onset of "second wind"?
- (a) Increase in heart rate
  - (b) Increase in rate of breathing
  - (c) Increase in vasodilatation
  - (d) Reduction of temperature in active muscles
58. If a well-nourished individual engaged in strenuous activity, what nutrient would be least likely to be metabolized as a source of energy?
- (a) Fat
  - (b) Protein
  - (c) Glucose
  - (d) Carbohydrate

59. In what part of the body is vasodilation best demonstrated?

- (a) Abdominal organs
- (b) Brain
- (c) Skeletal muscle
- (d) Nerve tissue

60. How is the oxygen requirement for an activity determined?

- (a) The oxygen debt incurred from the activity minus the resting level oxygen requirement
- (b) The amount of oxygen taken in during the activity that is in excess of the resting level plus the oxygen debt
- (c) The amount of oxygen taken in during the activity plus the resting level oxygen requirement plus the oxygen debt
- (d) The amount of oxygen taken in during the activity minus the oxygen debt

## ANSWER BOOKLET

AGE \_\_\_\_\_

SEX \_\_\_\_\_

STUDENT # \_\_\_\_\_

PLEASE DON'T WRITE BELOW THIS LINE  
-----

SECTION A \_\_\_\_\_

SECTION B \_\_\_\_\_

SECTION C \_\_\_\_\_

SECTION D \_\_\_\_\_

SECTION E \_\_\_\_\_

IF YES

1. \_\_\_\_ very aware      \_\_\_\_ somewhat aware      \_\_\_\_ not very aware  
    --- did not know of health benefits at all.
2. \_\_\_\_ high      \_\_\_\_ average      \_\_\_\_ low      \_\_\_\_ very low
3. A.      B.      C.      D.      E.      F.      G.      H.

IF NO

4. \_\_\_\_ very aware      \_\_\_\_ somewhat aware      \_\_\_\_ not very aware  
    \_\_\_\_ do not know of health benefits at all.
5. \_\_\_\_ very adequate      \_\_\_\_ adequate      \_\_\_\_ average      \_\_\_\_ inadequate
6. A.      B.      C.      D.      E.      F.      G.      H.      I.

SECTION B

1. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE
2. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE
3. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE
4. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE
5. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE
6. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE
7. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE
8. ☐ STRONGLY AGREE ☐ AGREE ☐ UNDECIDED  
☐ DISAGREE ☐ STRONGLY DISAGREE

SECTION C

1. \_\_\_ very high \_\_\_ high \_\_\_ average \_\_\_ low \_\_\_ very low
2. \_\_\_ very fit \_\_\_ fit \_\_\_ average \_\_\_ unfit \_\_\_ very unfit
3. \_\_\_ very unfit-fit \_\_\_ unfit-average \_\_\_ average-not very fit  
 \_\_\_ not very fit-fit \_\_\_ fit-very fit
4. \_\_\_ very fit \_\_\_ fit \_\_\_ average \_\_\_ unfit \_\_\_ very unfit
5. \_\_\_ very often \_\_\_ often \_\_\_ frequently \_\_\_ not very frequently  
 \_\_\_ never
6. \_\_\_ more easily \_\_\_ easily \_\_\_ as well \_\_\_ less easily  
 \_\_\_ hard
7. \_\_\_ very high \_\_\_ high \_\_\_ average \_\_\_ low \_\_\_ very low



## SECTION D

- |     |            |     |            |     |            |     |            |
|-----|------------|-----|------------|-----|------------|-----|------------|
| 1.  | A C<br>B D | 19. | A C<br>B D | 37. | A C<br>B D | 55. | A C<br>B D |
| 2.  | A C<br>B D | 20. | A C<br>B D | 38. | A C<br>B D | 56. | A C<br>B D |
| 3.  | A C<br>B D | 21. | A C<br>B D | 39. | A C<br>B D | 57. | A C<br>B D |
| 4.  | A C<br>B D | 22. | A C<br>B D | 40. | A C<br>B D | 58. | A C<br>E D |
| 5.  | A C<br>B D | 23. | A C<br>B D | 41. | A C<br>B D | 59. | A C<br>B D |
| 6.  | A C<br>B D | 24. | A C<br>B D | 42. | A C<br>B D | 60. | A C<br>B D |
| 7.  | A.C<br>B D | 25. | A C<br>B D | 43. | A C<br>B D |     |            |
| 8.  | A C<br>B D | 26. | A C<br>B D | 44. | A C<br>B D |     |            |
| 9.  | A C<br>B D | 27. | A C<br>B D | 45. | A C<br>B D |     |            |
| 10. | A C<br>B D | 28. | A C<br>B D | 46. | A C<br>B D |     |            |
| 11. | A C<br>B D | 29. | A C<br>B D | 47. | A C<br>B D |     |            |
| 12. | A C<br>B D | 30. | A C<br>B D | 48. | A C<br>B D |     |            |
| 13. | A C<br>B D | 31. | A C<br>B D | 49. | A C<br>B D |     |            |
| 14. | A C<br>B D | 32. | A C<br>B D | 50. | A C<br>B D |     |            |
| 15. | A C<br>B D | 33. | A C<br>B D | 51. | A C<br>B D |     |            |
| 16. | A C<br>B D | 34. | A C<br>B D | 52. | A C<br>B D |     |            |
| 17. | A C<br>B D | 35. | A C<br>B D | 53. | A C<br>B D |     |            |
| 18. | A C<br>B D | 36. | A C<br>B D | 54. | A C<br>B D |     |            |





